Michigan Residential Heating Oil and Propane Price Survey

2016-2017 Heating Season

This report summarizes the results of a survey of residential No. 2 distillate fuel oil (home heating oil) and propane (liquefied petroleum gas) prices over the 2016-2017 heating season in Michigan. The Michigan Agency for Energy (MAE) conducted the survey under a cooperative agreement with the U.S. Department of Energy's (DOE) Energy Information Administration (EIA). This survey was funded, in part, by a grant from the EIA.

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2016-2017 SHOPP Report

Winter Snapshot

The 2016-17 Michigan winter heating season was nearly 13 percent warmer than normal. Compared to the previous year, however, it was slightly cooler with the months of December and March both averaging just below normal. Despite a slightly cooler winter in Michigan compared to last year, the past U.S. winter (December-February) was the 6th warmest on record at 3.7 degrees (Fahrenheit) above the 20th century average, according to the National Oceanic and Atmospheric Administration (NOAA).[1]

The demand for propane during the heating season was readily met as the market maintained sufficient propane inventories. Although inventories were sufficient, an increase in propane exports did lower late season inventory levels to 42.8 million barrels, 32 percent lower than the same period last season. Increasing crude oil prices and exports helped to keep propane prices 25 cents higher on average for the nation between October and March.

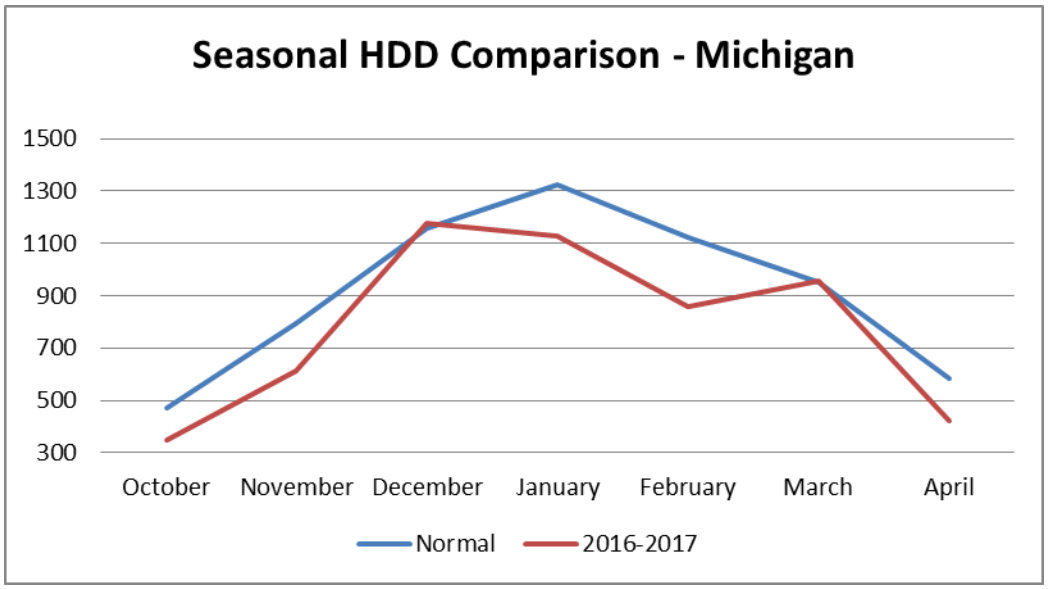
As mentioned above, crude oil prices have been on the rise since the end of the 2015-16 heating season. Prices averaged $38 per barrel in March of 2016 but soon climbed to near $50 per barrel in October to begin the 2016-17 heating season. In November, the Organization of the Petroleum Exporting Countries (OPEC) announced an agreement to cut production by

Highlights

- Michigan's "Winter Heating Season" (Oct. – March) was nearly 13 percent warmer than normal.
- Moderate weather led to a relatively uneventful winter heating season.
- Propane prices averaged 8 percent higher than the 2015/16 winter season.
- Heating oil prices averaged 10 percent higher than the 2015/16 winter season.
- U.S. propane stocks entered the last week of the season at 42.8 million barrels, 32 percent lower than the same period last season.

[1] National Oceanic and Atmospheric Administration
http://www.noaa.gov/news/us-had-2nd-warmest-february-and-6th-warmest-winter-on-record

1.2 million barrels per day starting in January of 2017, helping send prices into the $55 per barrel range for January and February. The Energy Information Administration's Short Term Energy Outlook (STEO) forecasts Brent crude oil to average $55 and $57 per barrel for 2017 and 2018 respectively. According to the EIA, despite the OPEC agreement, global production and inventory increases should provide for some downward pressure on oil prices through 2017 and into 2018. Heating oil did not experience any supply or serious price issues and remained readily obtainable all winter. Heating oil retains a smaller market share in Michigan, estimated at less than 2 percent.

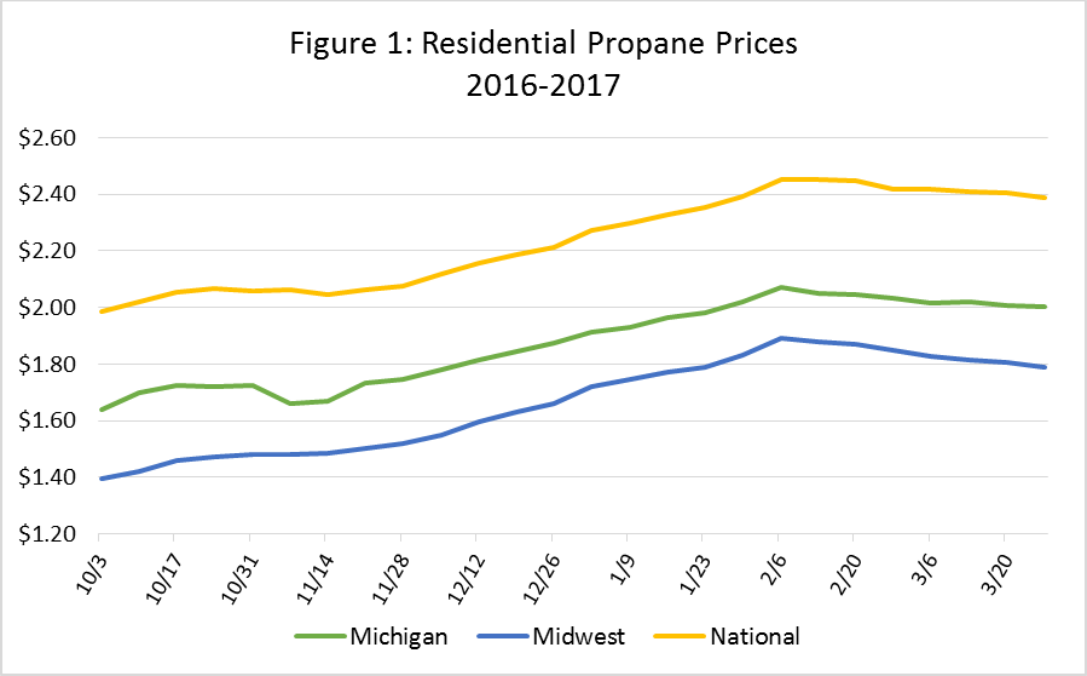


Purpose of Survey

The State Heating Oil and Propane Survey (SHOPP), is designed to collect data on state-level stocks and residential prices of No. 2 heating oil and propane during the heating season. The data are used to monitor the prices of propane and heating oil during the winter season, in an effort to maintain awareness of any price or supply irregularities that may be developing.

Residential Propane Prices

As noted above, the price of propane is closely tied with the price of crude oil, and the supply of propane is closely tied to available supplies of crude oil and natural gas. Factors contributing to this year's higher prices compared to last year were increasing oil prices and lower inventory levels across the nation. Inventory levels were drawn down due to increased exports out of PADD 3, the Gulf Coast region. Gulf Coast exports of propane/propylene increased from an average of 540 thousand barrels per day in September 2016 to 995 thousand barrels per day in January 2017.



According to the EIA, about 5 percent of U.S. households heat with propane. Michigan has the highest residential propane usage in the nation, and 8.4 percent of households use it as a home heating fuel.

As seen in Figure 1, Michigan propane prices were consistently below the trend of national prices, but higher than the Midwest throughout the entire heating season. At the start of the 2016-2017 heating season, the average residential price of propane in Michigan was $1.63 per gallon, excluding the 4 percent state sales tax. This was 12 cents lower than at the start of the prior year's heating season. The second week of the heating season saw a 7 cent increase, but then remained relatively flat throughout the remainder of October and November. Propane prices began to climb steadily starting the first full week of December and arrived at their season high of $2.07 in early February. The average price of propane over the October to March Survey period was $1.87 per gallon in Michigan, an increase of 14 cents from the survey period in 2015-2016.

2016	10/03	10/10	10/17	10/24	10/31	11/07	11/14	11/21	11/28	12/05	12/12	12/19	12/26
Michigan	1.63	1.70	1.72	1.72	1.72	1.66	1.66	1.73	1.74	1.78	1.81	1.84	1.87
Midwest	1.39	1.42	1.45	1.47	1.47	1.48	1.48	1.50	1.51	1.55	1.59	1.63	1.66
National	1.98	2.01	2.05	2.06	2.05	2.06	2.04	2.06	2.07	2.11	2.15	2.18	2.21

2017	1/02	1/09	01/16	01/23	1/30	02/06	02/13	02/20	02/27	03/06	03/13	03/20	03/27
Michigan	1.91	1.93	1.96	1.98	2.02	2.07	2.04	2.04	2.03	2.01	2.01	2.00	2.00
Midwest	1.72	1.74	1.77	1.79	1.83	1.89	1.88	1.87	1.85	1.82	1.81	1.80	1.79
National	2.27	2.29	2.32	2.35	2.39	2.45	2.45	2.44	2.41	2.41	2.41	2.40	2.39

Propane supply

As shown in Figure 2, the heating season began with U.S. propane stocks above the five-year average range, a carry through from the previous year when propane stocks were also above the five-year average range. According to the EIA, U.S. propane inventories stood at approximately 104 million barrels at the beginning of the heating season in 2016, about 4 million barrels more than propane stocks one year earlier. U.S. propane stocks remained within the five year-range throughout the winter and were at 42.8 million barrels coming into the last week of March, almost 32 percent lower than they had been at the same time the last year. Increasing propane exports were the main contributor to the year-over-year decline in propane stocks. Exports during the 2016-17 heating season were, on average, 37 percent higher than the prior year's heating season.

Figure 2: U.S. Propane Stocks

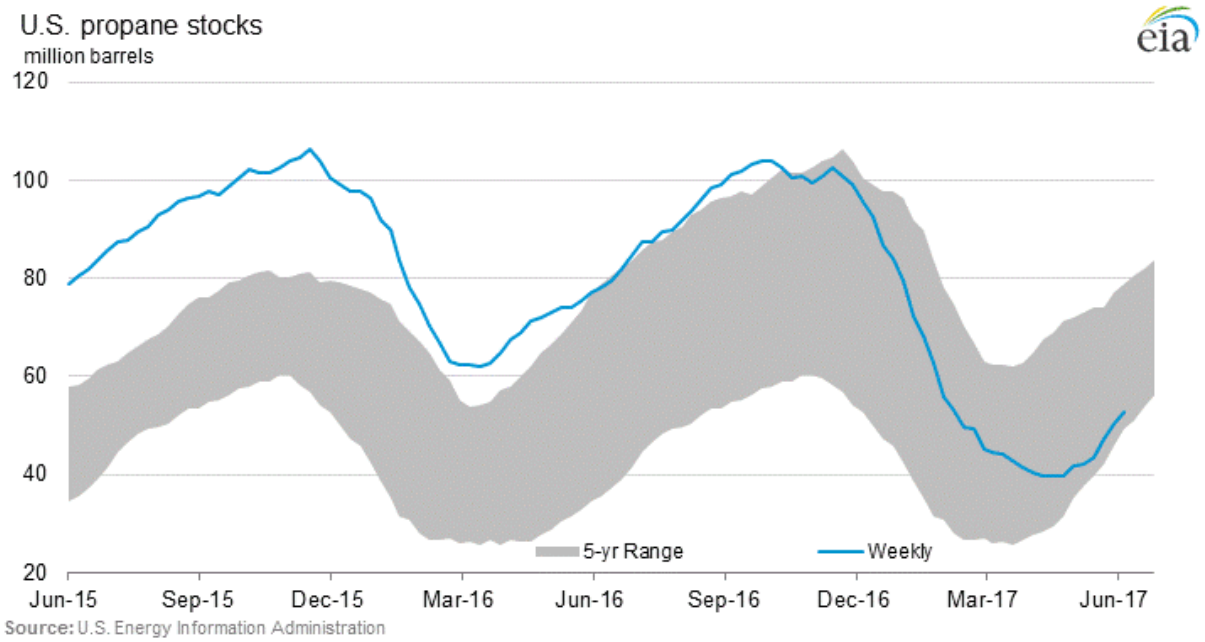
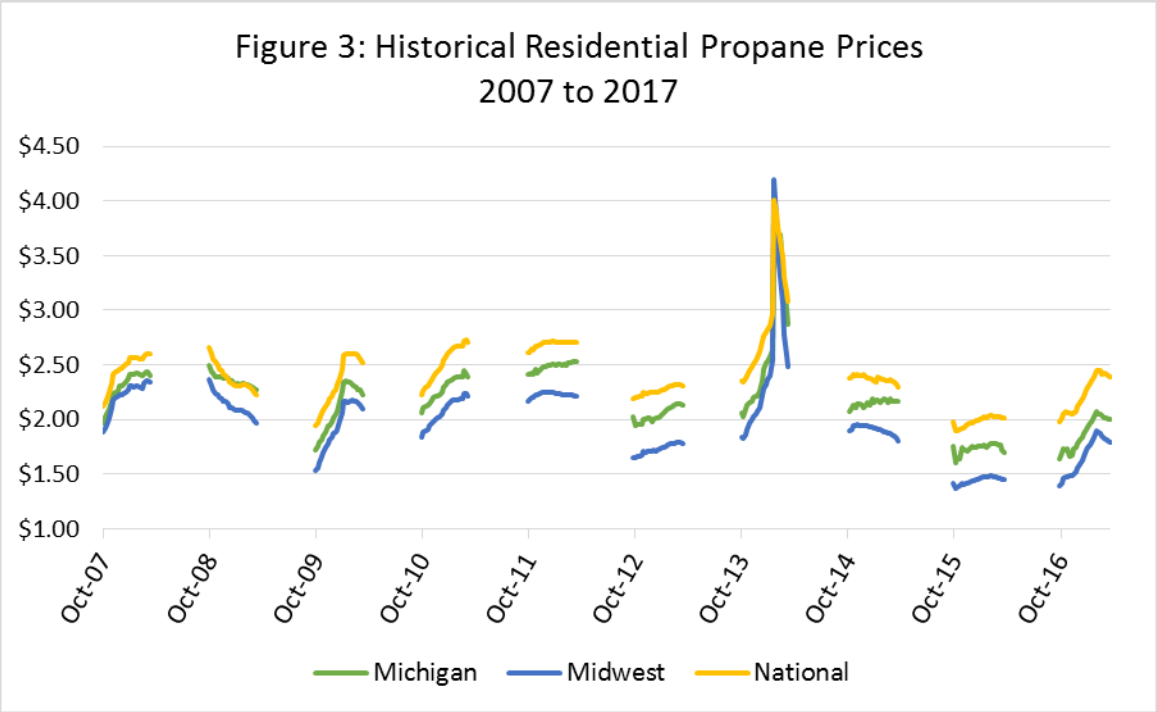


Figure 3 shows the pattern of monthly average propane prices over the previous ten heating seasons. Price effects from rising crude oil prices and declining inventories were likely offset by increased natural gas production, low natural gas prices, and favorable winter conditions throughout much of the nation. According to a 2016 propane market outlook prepared by ICF, propane production will be heavily dependent upon natural gas production and is projected to increase by 4 percent per year between 2015 and 2025. [2]

[2] ICF International 2016 Propane Market Outlook
https://www.afdc.energy.gov/uploads/publication/2016_propane_market_outlook.pdf



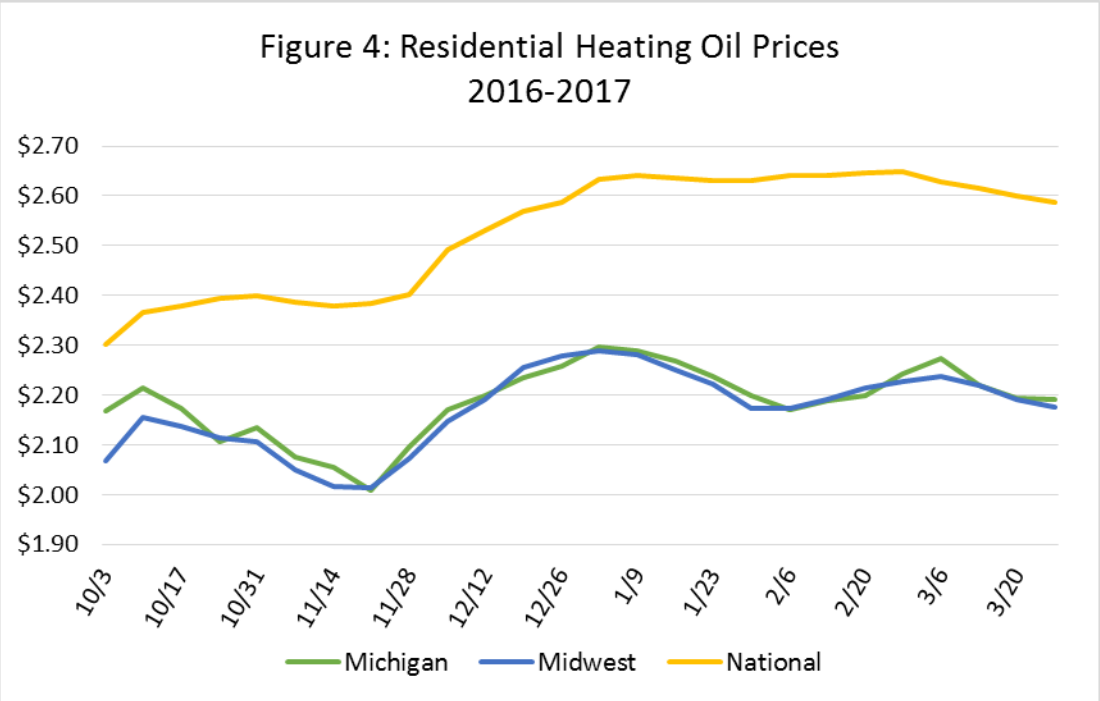
Residential No. 2 Heating Oil Prices

Heating oil prices showed a little less volatility than did propane this heating season. In Michigan, heating oil usage has gradually been supplanted by natural gas and propane, and now represents less than 2 percent of the heating fuels market in Michigan. While heating oil and diesel fuel are closely related products, No. 2 heating oil is not subject to the same environmental requirements or motor fuel taxes placed on diesel fuel. Historically, heating oil prices have generally tracked the price of crude oil, but are generally higher during the winter months when demand is higher.

As shown in Figure 4, heating oil prices in Michigan closely matched those found throughout the Midwest. National prices were higher than both Michigan and Midwest prices during the heating season.

2016	10/03	10/10	10/17	10/24	10/31	11/07	11/14	11/21	11/28	12/05	12/12	12/19	12/26
Michigan	2.16	2.21	2.17	2.10	2.13	2.07	2.05	2.00	2.09	2.17	2.19	2.23	2.25
Midwest	2.06	2.15	2.13	2.11	2.10	2.05	2.01	2.01	2.07	2.14	2.19	2.25	2.27
National	2.30	2.36	2.38	2.39	2.39	2.38	2.37	2.38	2.40	2.49	2.53	2.57	2.58

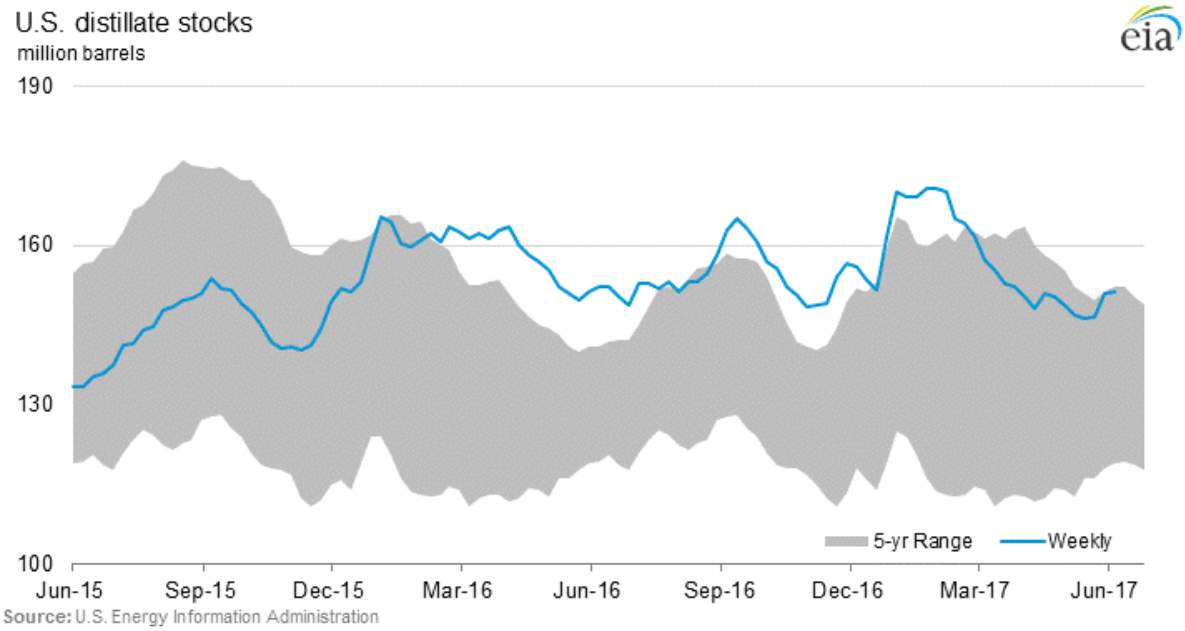
2017	1/02	1/09	01/16	01/23	01/30	02/06	02/13	02/20	02/27	03/06	03/13	03/20	3/27
Michigan	2.29	2.29	2.26	2.23	2.19	2.17	2.18	2.20	2.24	2.27	2.22	2.19	2.19
Midwest	2.28	2.28	2.25	2.22	2.17	2.17	2.19	2.21	2.22	2.23	2.22	2.19	2.17
National	2.63	2.64	2.63	2.63	2.63	2.64	2.64	2.64	2.64	2.62	2.61	2.60	2.58



The average price for heating oil at the start of the 2016-2017 Michigan winter heating season was $2.16 per gallon, excluding the 4 percent sales tax, 29 cents cheaper than at the beginning of the previous heating season. Prices fell during the early weeks of the season, bottoming out at $2.00 per gallon near the end of November before steadily increasing to a season high of $2.29 per gallon at the start of 2017. By the end of the heating season on March 27 2017, Michigan's average price was $2.19 per gallon. The average price of heating oil in Michigan over the course of the season was $2.18 per gallon, 20 cents higher and a 10 percent increase year over year. The overall increase in heating oil prices this season can likely be attributed to an increase in crude oil prices. European Brent crude oil prices averaged $39 per barrel during the 2015-16 heating season, compared to $51 per barrel throughout the 2016-17 heating season.

Figure 5 shows distillate inventory levels throughout the heating season. Total distillate stocks started the heating season above the five-year range and remained outside the average until March when stocks fell below the upper bound of the five-year range. Stocks went into the heating season at 160 million barrels, 9 million barrels above the same time period in 2015. Following an initial decline, stocks increased through November, December, and January, where levels reached a season high of 170 million barrels the week ending February 3rd. Inventories reached a season low of about 148 million barrels to finish the first week of November. The high inventory levels during the heart of the heating season were indicative of the warm winter seen in much of the nation, including Michigan.

Figure 5: U.S. Distillate Fuel Oil Stocks

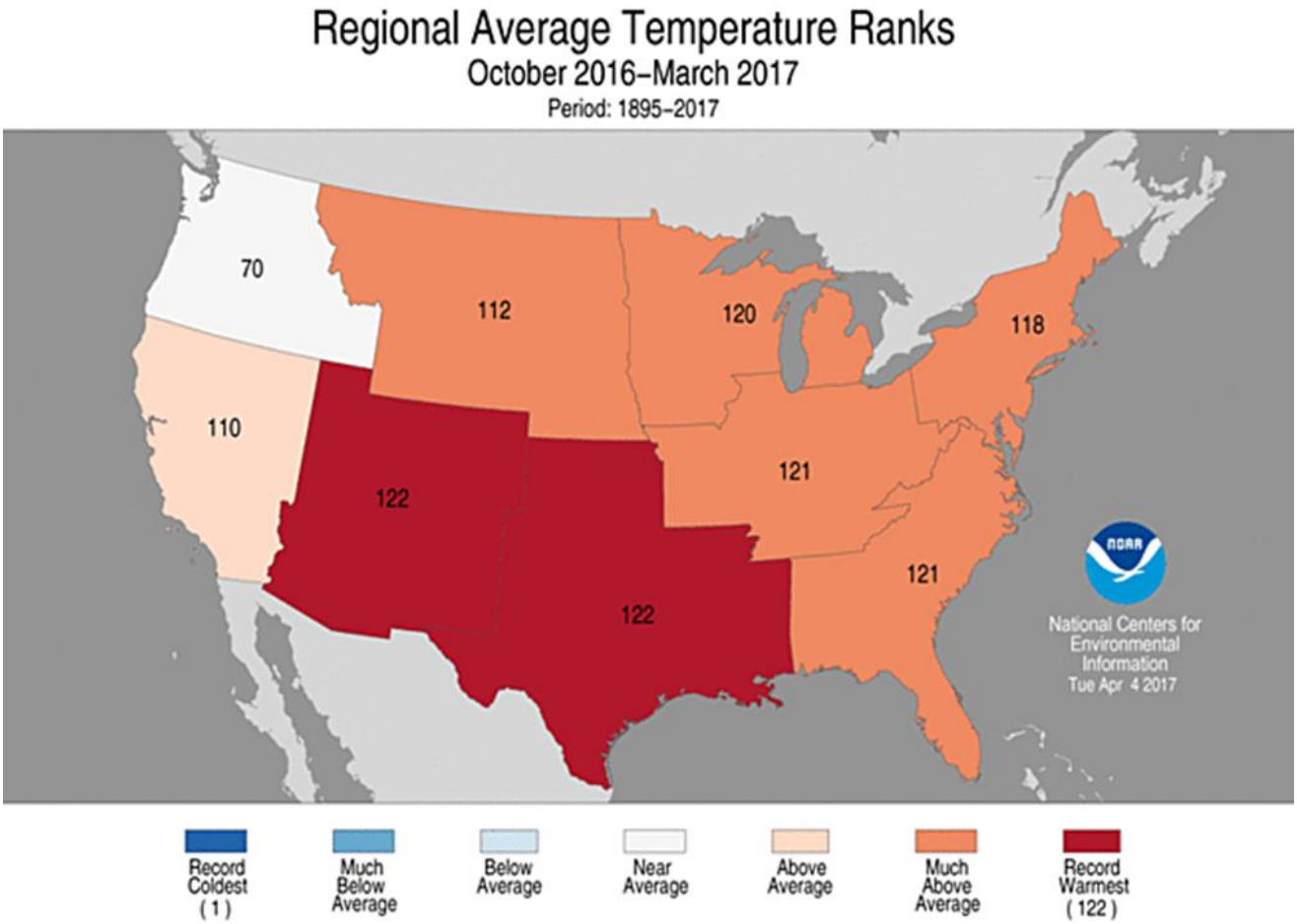


Weather Summary

Figure 6 depicts the regional temperature rankings for the United States from October 2016 – March 2017. As can be seen, almost the entire country experienced above-average temperatures during this time period. The average temperature for the contiguous U.S. during December to February was 3.7 degrees F above the 20th century average, the 6th warmest on record. The March average temperature for the Lower 48 states was 4.65 degrees F above the 20th century average, which puts it as the ninth warmest March on record.

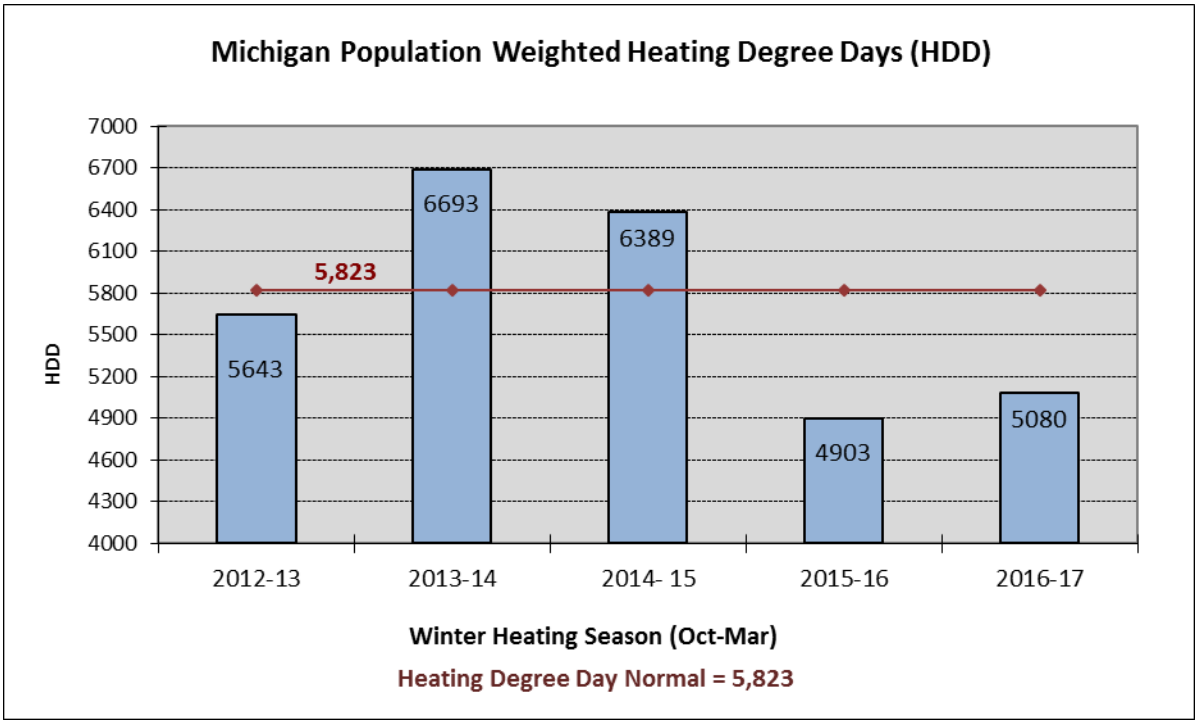
Figure 7 shows the population-weighted heating degree days for Michigan over the last five heating seasons. In Michigan, this past winter heating season (Oct - March) was nearly 13 percent warmer than normal, but over 3 percent cooler than the 2015-16 heating season[3].

Figure 6: U.S. Temperature Ranks



[3] National Centers for Environmental Information, NOAA. https://www.ncdc.noaa.gov/temp-and-precip/us-maps/

Figure 7: Michigan Heating Degree Days



Note: To provide a more accurate picture of winter heating demand, this chart has been revised to reflect only HDDs occurring during the Michigan winter heating season (October-March), as opposed to HDD totals for the entire year.

Methodology

The EIA provided the MAE with a list of survey participants. The sampling frame for heating oil distributors was an established list of approximately 11,000 fuel oil dealers and distributors from Form EIA-863, "Petroleum Product Sales Survey" (1989). EIA officials used a one-way stratified sample design for Michigan based on No. 2 residential distillate sales volumes. Due to limited propane supplier information, EIA statisticians developed two strata for propane dealers – large, multi-state dealers comprised the first, and a random sampling comprised the second (many sources were used to collect the names and addresses for the random sampling). EIA officials selected 21 fuel oil distributors and 27 propane dealers to participate in the 2014-2015 survey for Michigan. The "Winter Fuels Explanatory Notes," a link to which is posted on the flowing page, contains detailed information on the sample design.

Survey Dates -- The MAE conducted the survey weekly on each Monday or Tuesday beginning October 3rd, 2016, and ending March 27th, 2017.

General Reporting -- The MAE asked participants for the retail credit price charged to residential customers and verified changes from the reported price from the preceding survey. The No. 2 fuel oil residential price and the propane residential price are the credit prices paid for home delivery of 500 gallons. Reported prices excluded discounts and taxes. Participants reported prices to the nearest tenth of a cent (i.e., 0.895). The survey excluded sales to multi-family dwellings.

Electronic Filing -- EIA provided the MAE with an electronic filing web form known as the EIA Survey Data Collection System. After collecting the data, MAE staff uploaded it directly to EIA via a network connection to the Internet. Participants are listed alphabetically, identified by a seven-digit number, and prices are reported in dollars per gallon (i.e., $1.795).

Distribution of Aggregated Data -- After collecting the data, EIA officials edited and aggregated the information with surveys from the other states. The EIA published the survey results on their web site at http://eia.doe.gov/. For more information, visit this page or contact National Energy Information Center at (202) 586-8800.

Confidentiality of Reported Data -- Survey participation by fuel distributors is mandatory under the Federal Energy Administration Act of 1974 (Public Law 93-275). The EIA is responsible for assuring confidentiality of the data. Data on this form will be kept confidential and not disclosed to the public to the extent it satisfies the criteria for exemption under the Freedom of Information Act (FOIA), 5 U.S.C. Section 552, and other regulations. It may be released to the Department of Justice or to any other federal agency for official use, which may include enforcement of federal law. The information contained on this form may also be made available to any committee of Congress, the General Accounting Office, or other Congressional agencies authorized by law. A court of competent jurisdiction may obtain this information in response to an order.

Sources:

1) Residential Heating Oil Prices by Region and State, DOE/EIA-0208, *Weekly Petroleum Status Report*

http://www.eia.gov/dnav/pet/pet_pri_wfr_a_EPD2F_prs_dpgal_w.htm

2) Wholesale Heating Oil Prices by Region and State, DOE/EIA-0208, *Weekly Petroleum Status Report*

http://www.eia.gov/dnav/pet/pet_pri_wfr_a_EPD2F_PWR_dpgal_w.htm

3) Residential Propane by Region and State, DOE/EIA-0208, *Weekly Petroleum Status Report*

http://www.eia.gov/dnav/pet/pet_pri_wfr_a_EPLLPA_PRS_dpgal_w.htm

4) Wholesale Propane Prices by Region and State, DOE/EIA-0208, *Weekly Petroleum Status Report*

http://www.eia.gov/dnav/pet/pet_pri_wfr_a_EPLLPA_PWR_dpgal_w.htm

5) Winter Fuels Explanatory Notes, DOE/EIA-0208, *Weekly Petroleum Status Report*

http://www.eia.gov/petroleum/heatingoilpropane/pdf/explanatorynotes.pdf